



University of Bahrain

CE -- CIT -- UOB

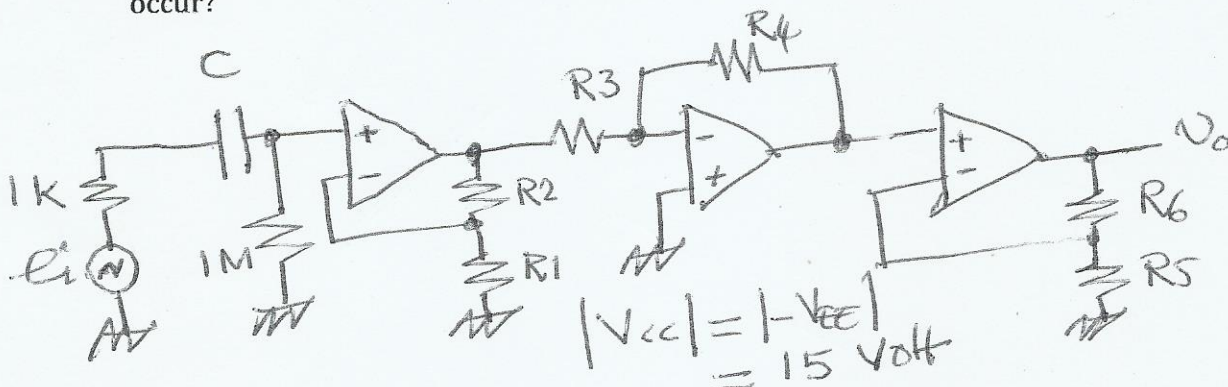
# TEST 1 (9 Nov 2015) ITCE363: Electronics 2

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## Q1. [60 marks]

In the following amplifier, the OP AMPs are 741 in which  $f_T = 1 \text{ MHz}$  and slew rate  $= 0.5 \text{ V}/\mu\text{s}$ .

1. Find  $R_1, R_2, R_3, R_4, R_5$  and  $R_6$  that make the mid-band gain value of each stage = 5
2. Find  $C$  that makes  $f_{\text{Low}}$  cutoff freq. = 100 Hz
3. Calculate the small signal bandwidth.
4. Calculate the gain in dB at  $f = 10 \text{ Hz}, 25 \text{ Hz}, 1 \text{ kHz}, 100 \text{ kHz}$  and  $250 \text{ kHz}$ .
5. What maximum input signal amplitude can you use before **clipping** distortion starts to occur?
6. What maximum input signal frequency can you use before **slew rate** distortion starts to occur?



## Q2. [40 marks]

In the following amplifier, assume  $R_1 = R_2 = 120 \text{ k}\Omega$ ,  $C_{c1} = C_{c2} = C_E = \infty$ ,  $L_T = 25 \mu\text{H}$  with  $2 \Omega$  internal resistance,  $r_{\text{out}}$  of the transistor =  $50 \text{ k}\Omega$ , assume  $C_{\text{stray}}$  of o/p =  $10 \text{ pF}$ :

- a) Find  $R_E$  for  $I_C = 0.5 \text{ mA}$ . Find  $V_{CE}$ . Assume  $V_{CC} = 12 \text{ volt}$ .
- b) Find  $C_T$  that tunes the amplifier at  $1.5 \text{ MHz}$
- c) Find  $f_1, f_2$  and the BW of the amplifier
- d) Find the voltage gain in dB at resonance and at  $f_1$  and  $f_2$ .
- e) If this amplifier is driving  $R_L = 10 \text{ k}\Omega$ , what will be the new BW and voltage gain.

